

EXHIBIT A



AIRGAS MERCHANT GASES

Dublin, GA

Improper Adsorber Vessel Filling August 13th, 2018



1. **Description of Event**

During week of 12th February of 2018, contractor Rolan Plant Services (RPS) was called onto site to fill three adsorber vessels at the Dublin VSA during the installation phase of the plant. These vessels were filled with both Activated Alumina (on the bottom) and Mol Sieve (on the top). RPS was given the Air Liquide adsorber vessel filling procedure prior to the work. RPS also has prior similar filling references with Air Liquide and Airgas. Following work and during the commissioning phase, the VSA was not meeting the appropriate spec of 91% GOX as required. Upon investigation, the team found that the bottom layer of alumina was filled in excess that created a bypass resulting in low final product purity. A root cause analysis team was subsequently assembled and the investigation yielded that procedures were not appropriately followed.

Incident Timeline and Details:

January 22nd, 2018: RPS is given detailed sieve filling instructions for the job and AL spec.

February 2018: Roland Plant Services fills all three adsorber vessels with sieve and alumina material

March 2018: VSA Installation is completed

April 2018: VSA is brought online and commissioned and plant begins to experience poor product purity immediately (72% GOX vs. 91% GOX – target).

April 2018: Pressure tested the vessels and confirmed the valves aren't leaking.

May 11th, 2018: Vessels were opened up and sieve material samples were collected and sent to Air Liquide lab and Zeochem lab for analysis. Sample results show no contamination to Sieves.

June 2018: Air Liquide VSA experts suggested higher levels of alumina in the beds is creating Air bypass and likely cause of the low purity.

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June 8th, 2018: Mol sieve is removed and higher levels of alumina are found inside the vessel. The extra amount of alumina is removed.

July 4th, 2018: RPS refills the adsorber vessel with the removed sieve, with AL France experts were onsite to validate the filling process and height of alumina in the beds after refilling.

July 9th, 2018: After completion of leak tests the VSA was restarted

July 16th, 2018: Product sent to the pipeline at proper purity with no issues to report since then.





2. Observations, Discussion and Investigation

During the first quarter of 2018, the Airgas projects team began the final stage of work for bringing the Dublin VSA online. Inherent to this stage was the charging of three adsorber vessels with activated alumina (bottom) and mol sieve (top). The alumina was purchased new as Axsorb AB 4x8 Mesh. 30,800 lbs was purchased and the quantity came in 88 drums each weighing 350 lbs. The mol sieve was previous material that was regenerated and passed appropriate QA/QC validation by Zeochem. 89,000 lbs of mol sieve in 356 drums was delivered onsite and was to be divided equally between each of the three vessels. Beds were additionally top filled with varying quantities of mol sieve.

- 9 additional drums of mol sieve in bed one
- 3 additional drums of mol sieve in bed two
- 7 additional drums of mol sieve in bed three

The filling procedure entitled "Filling the Mushroom Adsorbers" is a 2003 Air Liquide spec. that was given to RPS and their team understood and acknowledged the receipt of the procedures. The team at RPS is certified for confined space work and went through appropriate training before commencing filling operation.

Following filling, the startup and commissioning team proceeded on with other startup items associated with mechanical, electrical and controls.

Mechanical:

- Machinery
- Piping

Electrical:

- Electrical System

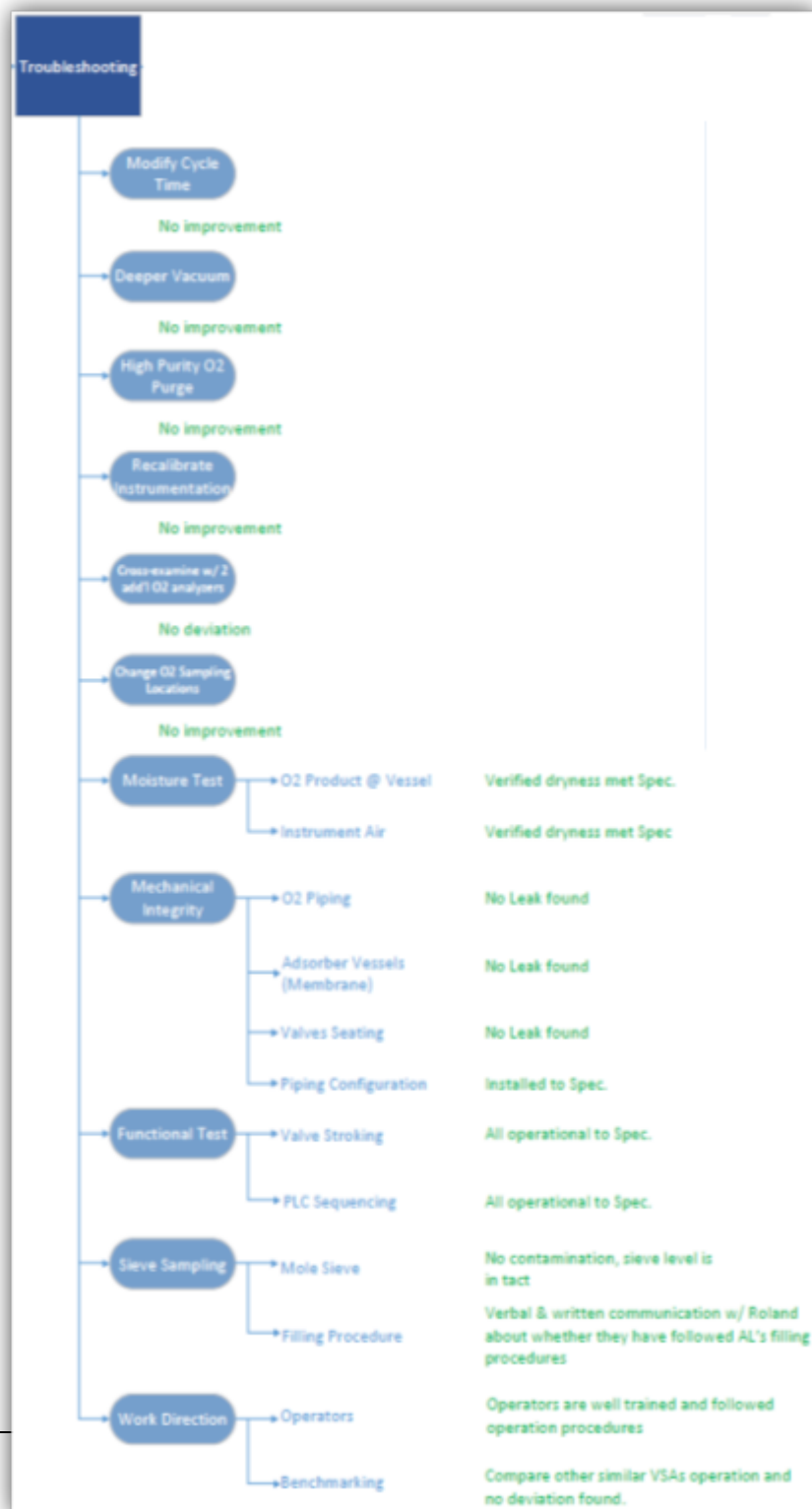
Controls:

- Analytical
- Instrumentation
- Control System

After these systems were implemented, from April 6th to April 13th, the VSA was brought online but oxygen purity was not meeting target (72% vs 91% target).



A series of troubleshooting steps followed during the latter half of April and May 2018.





The initial round of troubleshooting had the team checking the mechanical, electrical and controls areas highlighted above. Seeing that all these didn't yield a definitive smoking gun, the team moved onto interviewing different parties.

Air Liquide experts: In talking to AL VSA experts in France, they advised the team to check on the integrity of the vessels themselves and also of the Sieve material. Furthermore, the fill layering was to be checked as improper heights of material could be causing channeling and improper flow leading to decreased purity. The latter advice proved to be true.

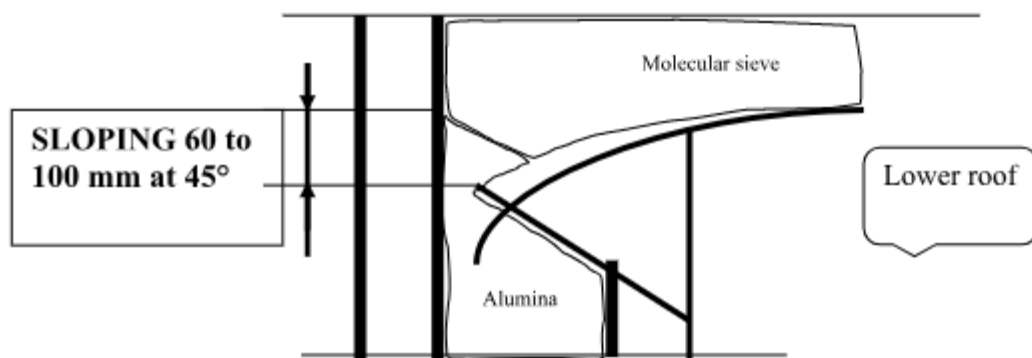
Ranch Cryogenics: This team was involved with the installation onsite. Upon interviewing and checking with this contractor, they had no installation issues to report.

Rolan Plant Services: Upon discussing with Rolan, the team uncovered that the RPS workers used all of the alumina in the drums that they were supplied. This was a major issue as they were supposed to have excess left over. It is common practice to order excess material to compensate for the losses during handling and filling. Furthermore, when fill material is typically shipped, there is usually a slight discrepancy in density so the volume in each drum may differ slightly and also fill density affects the amount of material filled in each vessel. These factors affect the amount of material required in each vessel and may differ from the calculated values.

Due to this fact, it's incredibly important to follow the Air Liquide spec. on filling these adsorbers. In it, it explicitly diagrams and notes that the "final top off of alumina should be 60-100 mm at the lower roof." As mentioned, RPS acknowledged the receipt of this spec. and had read through it prior to starting work. The investigation yielded that the contractors violated this requirement and filled above this threshold.

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- After noting the level of missing alumina, top-off the required level with a plastic bucket, while sloping the alumina by some 60 to 100 mm at the lower roof, according to the sketch below. Move the alumina accumulated on the roof towards the slope.



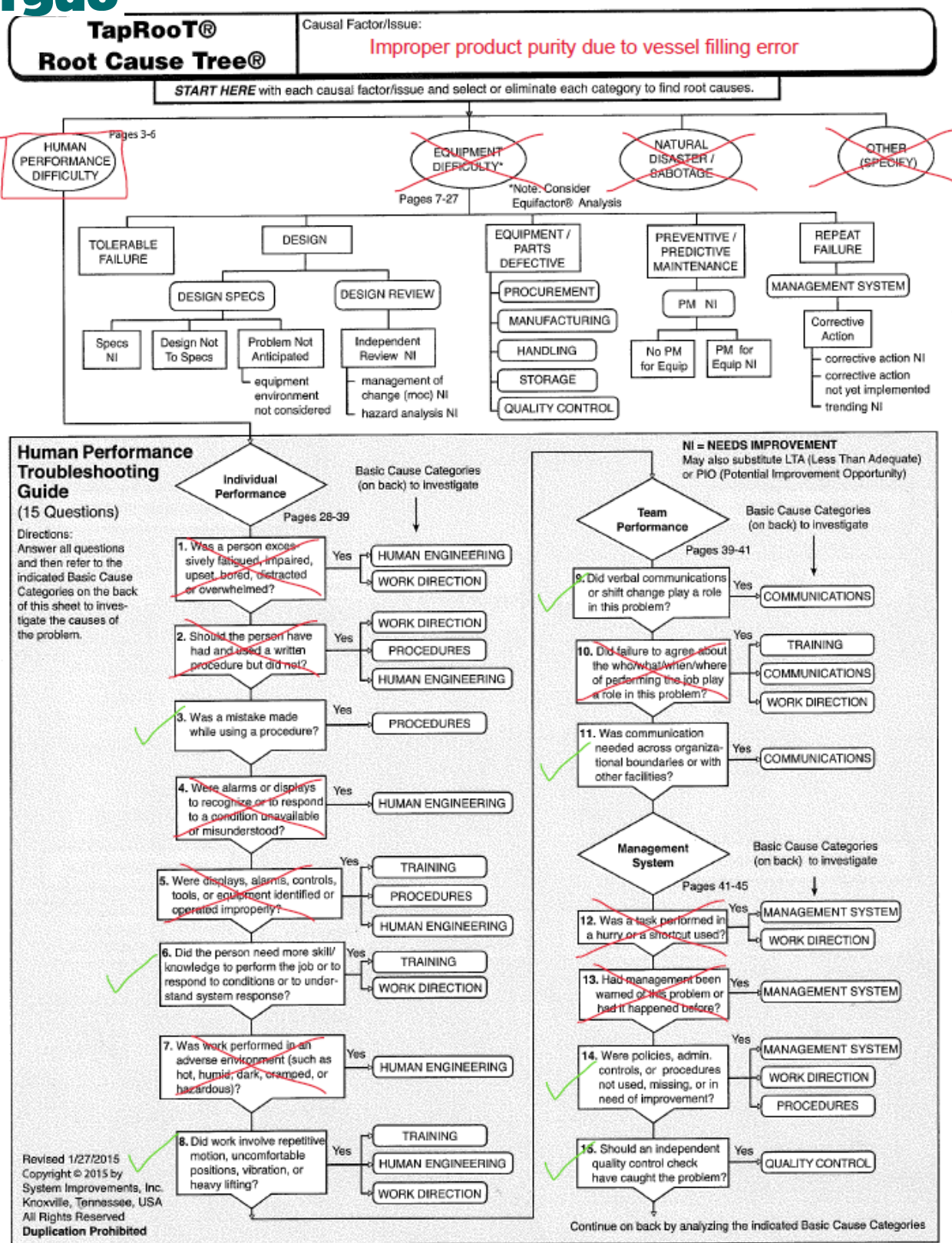
3. Contributing Factors/Root Cause Analysis

As part of the investigation, the team employed the TapRoot Root Cause Tree to zone in on specific root causes to the improper product purity.

The root cause methodology was orchestrated as follows. There are four main categories which the root causes are filed under: human performance difficulty, equipment difficulty, natural disaster/sabotage, other.

For this case, it was apparent that the root causes lay under the human performance difficulty section. Under this, there are fifteen guiding questions that prompt the user to investigate further basic cause categories. These screening questions resulted in the following basic cause categories being investigated: procedures, training, quality control, communications, management system, human engineering, and work direction.

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Drilling down into each cause category yielded the following root causes:

- Procedures followed incorrectly, check off misused

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This is the most obvious root cause as its been previously detailed that the AL spec. on adsorber vessel filling was already given to RPS to follow and an error was made when filling the alumina layer.

- **Training understanding and instruction needs improvement**

Rolan has been used by Air Liquide and Airgas numerous times when it comes to adsorber vessel filling. Although the team was validated by Airgas and appropriately trained, during the actual filling, it is the foreman's responsibility to ensure the job is carried out in the correct manner and ensure that his team is trained and understands the intricacies of the work.

- **Quality control inspection instructions needs improvement**

After the completion of work, RPS needed to visually inspect the level in the adsorber before filling the top layer with mol sieve. The confined space team part of RPS did not appropriately validate the height of alumina before proceeding. This was confirmed when the investigation team found that alumina levels in all three beds were overfilled by four inches.



- **Communications turnover process needs improvement**

Following work, RPS should have communicated to Airgas personnel the quantity of alumina used for filling (turn over fill sheets) and also confirm with pictures inside the vessel the height to which they filled. If this were done, the wrong level would have been noticed immediately by Airgas and the issue would have been addressed.

- **Human engineering excessive lifting/force**

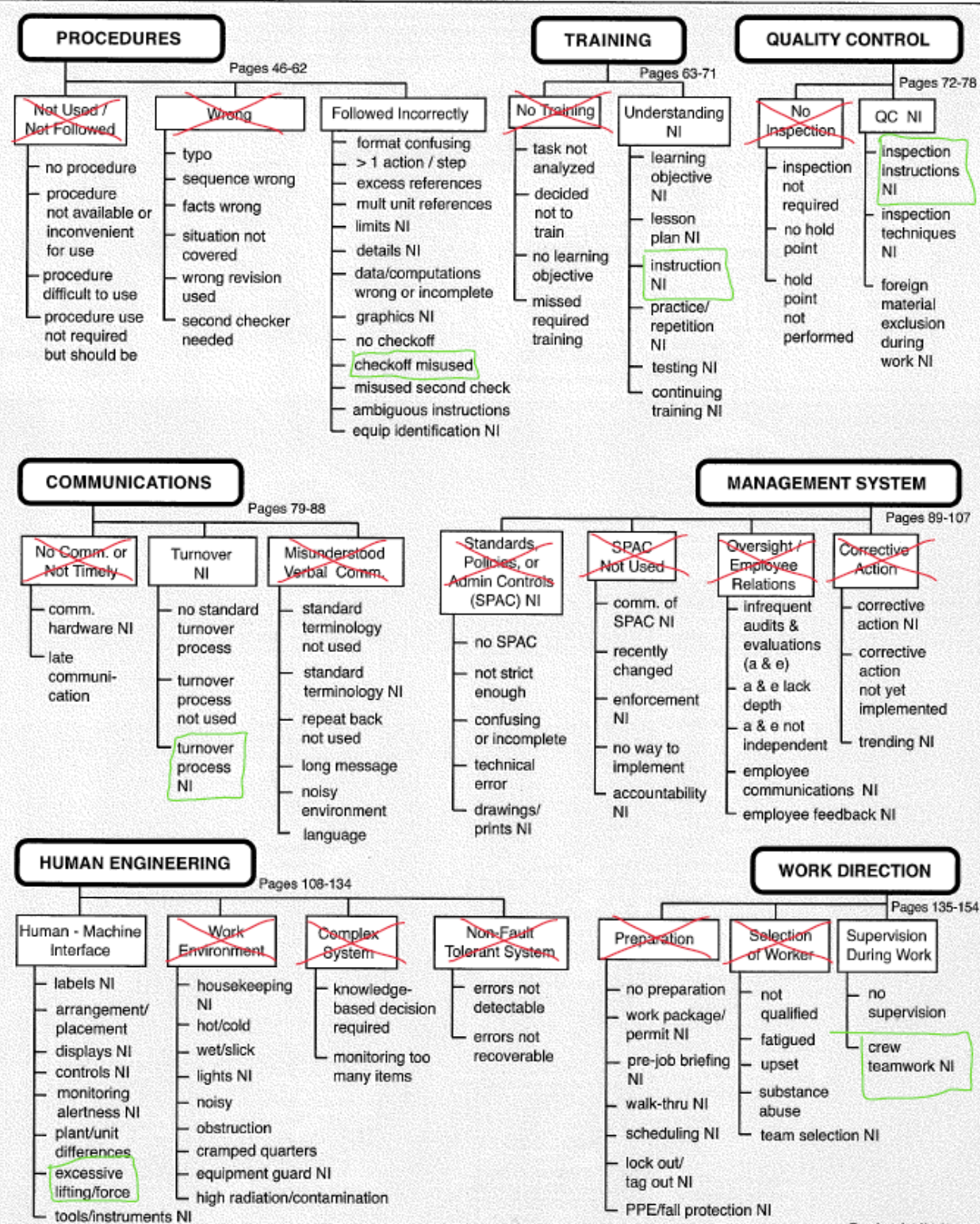
The alumina came in 88 drums each weighing 350 lbs and the total filling of three vessels took seven days to complete. The large quantity of material and the repeated nature of the work could have contributed to the overfilling error.

- **Crew teamwork needs improvement**

Similar to the training root cause, the confined space team that did the final measurement of the alumina level should have been aware of the appropriate target height and caught the overfilling immediately.



TapRoot® Root Cause Tree® Basic Cause Categories



NI = NEEDS IMPROVEMENT

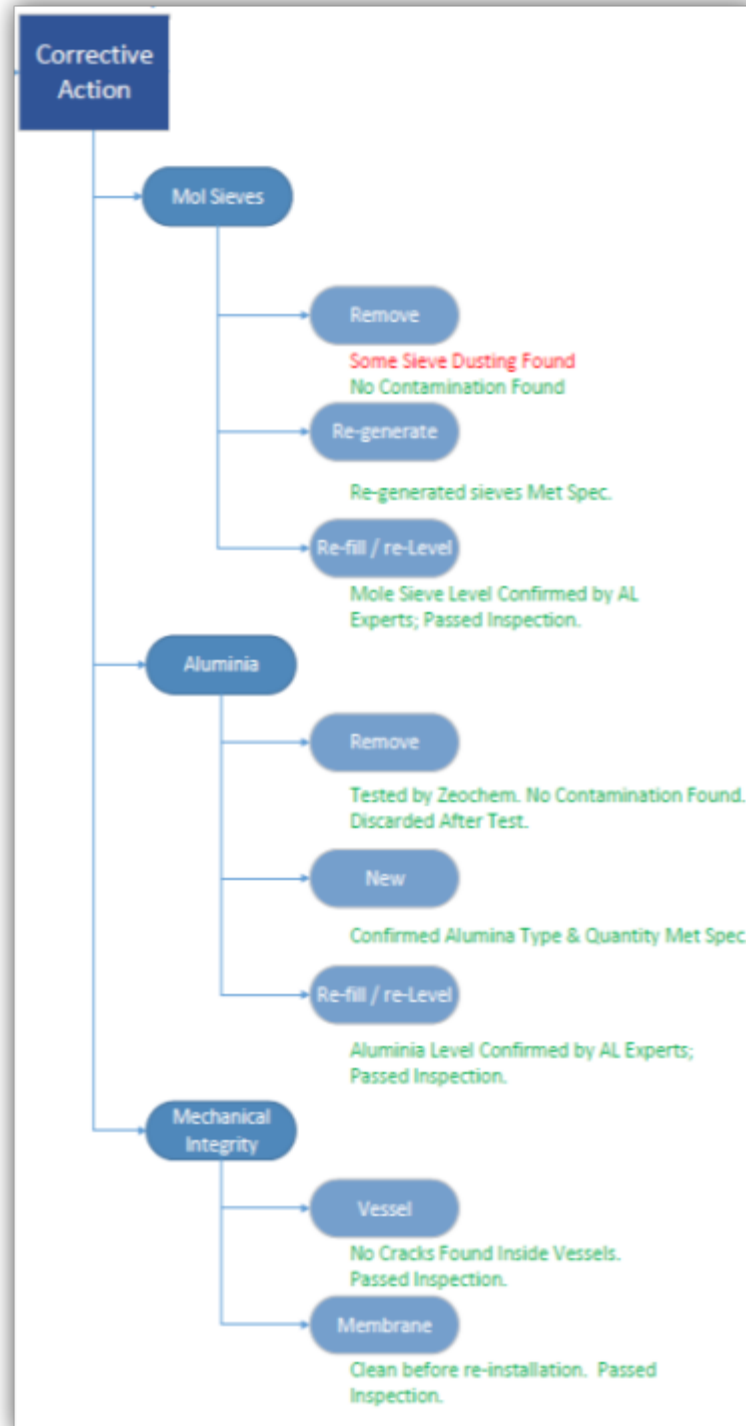
May also substitute LTA (Less Than Adequate) or PIO (Potential Improvement Opportunity)

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4. Corrective Actions

Once the team pinpointed the source of the poor purity, the following details the list of corrective actions taken.



RPS was brought in again and removed the upper mol sieve layer and measured the alumina layer which was found to be above what was required. The team then removed

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the additional alumina and eventually emptied the entire vessel. The mol sieve that was removed from the vessel was regenerated and topped off with new Mol sieve to compensate for the handling losses.

Upon receiving regenerated Sieve material and new Alumina, the vessels were recharged and the VSA was restarted and the plant began making the required product purity and hasn't had any issues since July 2018.

5. Summary/Conclusion

At the conclusion of the investigation, the team found that clear instructions were given for appropriate vessel filling to Rolan Plant Services prior to the job at the Dublin VSA in early 2018. RPS acknowledged receipt of the spec. and ensured the Airgas team that the job would be handled with a group of experienced, professional contractors who had done this type of work before.

The root cause investigation yielded that procedures were not adequately followed overall by the RPS team and it resulted in the bottom alumina layer being overfilled past what was required. The root cause team recommends the whole RPS team sitting down with Airgas personnel and reviewing the job and AL spec. prior to beginning work. RPS should explicitly acknowledge the proper filling heights so that there is no ambiguity between what has been communicated and what is carried out. Following completion of any bottom layer alumina filling. There should be a visual check presented to Airgas for proper height verification before proceeding onwards.

March 23

March 23

April 6

April 6 to 13

Mechanical Completion

Electrical Completion

Control Completion

VSA Not Making Purity

